

Incapacitating Mediastinal Pain and Hemodynamic Compromise Due to a Non-Displaced, Acutely Kinked Nasogastric Tube in a Post-operative Esophagectomy Patient - A Case Report

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Abstract

A case of incapacitating mediastinal stretch pain and hemodynamic compromise, caused by a non-displaced, non-functional acutely kinked naso-gastric tube (NGT). Post-operative esophagectomy patient started complaining of severe retrosternal pain after 2 h. Epidural boluses of bupivacaine and other intravenous analgesics were given with no relief. After some time, the patient went into atrial fibrillation and subsequent hypotension. Chest X-ray revealed mediastinal shadow caused by distended neoesophagus, and NGT was found to be acutely kinked, which prevented complete decompression of esophagus. Expanded neoesophagus caused a mass effect irritating the right atrium and causing atrial fibrillation, while stretching of nociceptive rich mediastinal structures led to persistent severe pain. NGT was manipulated, in an attempt to resolve the kink and although the kink could not be removed completely, it smoothed out enough to deflate the expanded neoesophagus. The pain subsided within 45 min of the NGT manipulation. Electrocardiography pattern also reverted to sinus rhythm within 24 h.

Keywords: hemodynamic compromise, Esophagectomy, Kinked Nasogastric tube, Mediastinal pain

Introduction

Esophagectomy is a distinctive and technically demanding surgery. Perioperative care in patients to be submitted to esophagectomy should be individualized since intraoperative course may influence morbidity and mortality. Surgical resection remains the gold standard for localized esophageal tumor, but esophagectomy is a complex operation with several serious post-operative implications, which may result in high morbidity and mortality [1]. Surgery involves surgeon assisted placement of a nasogastric tube (NGT) within neoesophagus intraoperatively. NGT tip is sited in a distal part of neoesophagus and serves the purpose of decompressing the gastric conduit [2]. NGT assisted decompression prevents distention of gastric conduit and hence prevents possible complications such as anastomotic leak, pulmonary aspiration, and respiratory infection [3]. Many of the complications in the post-operative period

occur as a result of displaced NGT. Here, we present a unique case of distension of neoesophagus presenting as potential posterior mediastinal mass effect leading to incapacitating mediastinal stretch pain and hemodynamic compromise, caused by a non-displaced, nonfunctional acutely kinked NGT.

Case Report

A 55-year-old ASA II male patient presented with complaints of epigastric discomfort, decreased oral intake and weakness since 3–4 months. He reported progressively worsening dysphagia with solids only since the past 2 months. He denied cough, regurgitation, hoarseness, palpitations, and dyspnea. Medical history was significant for chronic obstructive pulmonary disease since 10 years with no accompanying cardiovascular illness. He was a former smoker (30 pack-years of smoking) but claimed to have quit smoking since past 5 years. Hemogram, biochemical, and

coagulation studies were within normal limits. Electrocardiography (ECG) showed normal sinus rhythm with left ventricular hypertrophy. On echocardiography, there was mild global hypokinesia with left ventricular ejection fraction of 45%. Dobutamine stress echocardiography was negative for reversible myocardial ischemia. His pulmonary function test was unremarkable, with forced expiratory flow in 1 s of 3 L/s and forced vital capacity 3.43 L, both of which were more than 95% of the predicted value associated with normal gas exchange. Esophagogastroscope revealed a grossly malignant mass at the lower end of the esophagus. Biopsy of the lesion showed infiltrating squamous cell carcinoma. The patient underwent transthoracic esophagectomy (Tri-incisional: McKeown Technique) with 2-field lymphadenectomy that lasted 4.5 h. Surgery was performed under combined general and thoracic epidural anesthesia. 39F (left) Double Lumen Tube was placed for lung isolation. Surgery proceeded with a midline laparotomy for creation of a neoesophagus using stomach, followed by a right thoracotomy with right pulmonary exclusion, with the patient placed in the left lateral decubitus position. Intraoperative and immediate post-operative course were

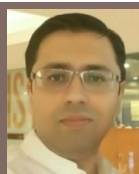
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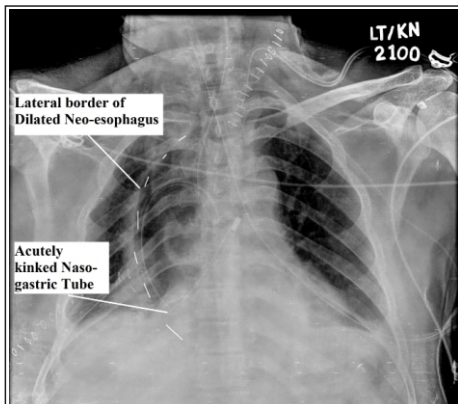


Figure 1: Acute kinking of nasogastric tube causing dilated neoesophagus



Figure 2: Kinked nasogastric tube after removal

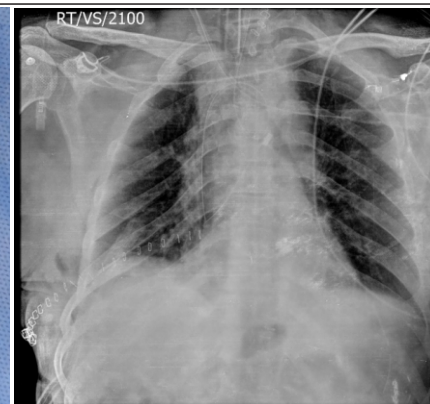


Figure 3: Collapsed neoesophagus after manipulation of nasogastric tube

uneventful. The patient was extubated on the OT table and then transferred to the surgical intensive care unit. Post-operative analgesia was provided by epidural infusion of 0.1% bupivacaine with 2 mcg/ml fentanyl at 7 ml/h. The patient was hemodynamically stable and pain-free for the first 2 h of incentive care unit stay, following which he complaint of retrosternal and right parasternal pain (visual analog scale [VAS] >8–9/10). Epidural bolus of 6 ml 0.125% bupivacaine and later 5 ml 2% lignocaine, IV diclofenac (75 mg), paracetamol (1 g) and morphine (3 mg boluses to a total of 7.5 mg) were given with no appreciable response. Severity of pain continued to be intense (VAS >8–9/10). Nearly 1.5 h after the first complaint of intolerable pain, the patient had an episode of atrial fibrillation and subsequent fall in blood pressure to 74/34 mmHg. Arterial blood gas and chest X-ray were ordered. Amiodarone 150 mg IV bolus, followed by infusion of 900 mg/24 h. Pain intensity remained at VAS 10/10 despite multi-modal analgesia. Epidural infusion was withheld in view of hemodynamic instability. Chest X-ray revealed a fusiform radiolucent smooth mediastinal shadow overlapping cardiac silhouette [Figure 1]. This shadow was cast by a distended neoesophagus [4]. Neoesophagus, being a denervated segment, lacks an antegrade peristaltic property, rendering it devoid of any propulsive movement (as this segment is otherwise drained by gravity). NGT inserted and positioned intraoperatively by the surgeon, so as to decompress neoesophagus, was found to be acutely kinked. This acute kink prevented complete decompression of esophagus. Hence, an expanded neoesophagus caused a mass effect behind

right atrium and stretched mediastinal structures. This mass effect was thought to irritate right atrium causing atrial fibrillation and subsequent hypotension. Stretching of nociceptive rich mediastinal structures led to persistent severe retro and parasternal pain, not responding to multi-modal regimes. After discussion with the surgical team, NGT was manipulated slowly, in an attempt to resolve the kink and make the tube patent and functional. Although the kink could not be removed completely, it smoothed out enough to deflate the expanded neoesophagus (confirmed with repeat chest X-ray). Any attempt to reposition NGT further or through endoscopy was deferred, as it would potentially harm the anastomotic site. Although the atrial fibrillation continued, the pain subsided within 45 min after this maneuver. Amiodarone and noradrenaline infusion was continued for 24 h, following which ECG pattern reverted to sinus rhythm, and normotension was achieved. Epidural analgesia (patient-controlled epidural analgesia) was restarted the next day, after stable hemodynamics was attained. Until that time, IV paracetamol and diclofenac were given for analgesia on TID basis. Injection Enoxaparin 40 mg was initiated from the second post-operative day. Thereafter, the post-operative course was uneventful, and the patient was transferred to step down unit on post-operative day (POD)-3. Subsequent chest X-ray done on POD 5 showed a decompressed neoesophagus with the kinked NGT. NGT was removed on post-operative day, and strangely it could be removed smoothly. The patient was discharged home on POD7.

Discussion

Esophagectomy involves the creation of neoesophagus using gastric pouch, which is then pulled up into anterior mediastinum by retrosternal railroading method. This gastric conduit, being denervated, loses its ability for forward propulsion of contents. Unloading of neoesophagus is mainly gravity assisted. Hence, it needs decompression in the immediate post-operative period. NGT is placed intraoperatively by the surgeon, and its tip is placed in distal one-third of the conduit [5]. This keeps the conduit decompressed and helps prevent possible complications such as anastomotic leak, regurgitation, and mediastinal and pulmonary soiling. A distal gastric drainage procedure is usually performed to avoid stasis of contents in conduit. Various procedures performed include pyloromyotomy, pyloroplasty, and botulinum injection with conflicting evidence for the efficacy of the same. Pyloroplasty was not performed in this case. Intraoperative course of the present case was uneventful. The patient complained of unrelenting pain (VAS 9–10/10) after nearly 4.5 h of surgery, not responding to multimodal strategies, followed by atrial fibrillation and hypotension. NGT tip was seen to be acutely kinked proximal to terminal drainage ports, hence rendering it nonfunctional. This kink further prevented decompression of the dilated neoesophagus, which dilated slowly over time with air to simulate an expanding posterior mediastinal mass. The absence of a functional distal drainage procedure also could prevent emptying of esophageal contents, further complicating the scenario. This mass effect was proposed to stretch nociceptor rich mediastinal structures causing intense pain, which was unresponsive to multi-modal

strategies. Being placed in the posterior mediastinum, this expansile mass could irritate right atrium leading to atrial fibrillation. Hypotension could be caused by atrial fibrillation or by atrial compression by posterior mediastinal mass, further leading to decreased venous return. The surgical opinion was sought for the same, and any manipulation of NGT was considered unsafe, in the presence of fresh anastomosis. Need for endoscopic adjustment of NGT was also discussed but the surgical team was reluctant to do so, and it was then planned to completely withdraw NGT if symptoms persisted after slight manipulation. Fortunately, in this case, the slight manipulation smoothed out the acute kink. After a literature review, the role of distal drainage procedures (post-

esophagectomy) is not substantiated with strong evidence. Furthermore, NGT is not inserted for decompression of neoesophagus in a few centers. Whether the described sequence of events in our case could have been prevented by pyloroplasty or a functional NGT, could not be ascertained. Furthermore, literature search did not mention any case report with similar sequence of events, and our management was purely based on symptoms and clinical findings of the patient. Hence, this seems to be an extremely rare clinical presentation about which a clinician should be aware of, and we intend to do so by presenting our experience. The management strategy followed in the present case was based on the pretext of expanding retrocardiac (posterior mediastinal) mass, compressing

and irritating right atrial free wall, leading to atrial fibrillation and decrease in cardiac output, could possibly support a nonfunctional (kinked) NGT placed in neoesophagus. With the absence of a distal drainage procedure, air could neither pass through nor be expelled by NGT. Hence, gentle manipulation of NGT to smoothen out kinked NGT immediately decompressed the conduit and decreased the agonizing retrosternal pain felt by the patient; and stabilized hemodynamics over a period of 24 h. By reporting this incident, we emphasize to evaluate air filled neoesophagus as a possible cause of retrosternal pain and hemodynamic compromise in the immediate post-operative period in a case of esophagectomy.

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